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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/695,353

10/29/2003

Noboru Matsusaka

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23117

7590

12/02/2005

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EXAMINER

ROJAS, BERNARD

ART UNIT

PAPER NUMBER

2832

DATE MAILED: 12/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/695,353

Applicant(s)

MATSUSAKA, NOBORU

Examiner

Bernard Rojas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 09092005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments, filed 09/09/2005, with respect to the rejection(s) of claim(s) 1-3 under 35 USC § 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Richter et al. [US 4,419,132] in view of YAMAMOTO et al. [JP 57109310A]. Richter et al. discloses the claimed apparatus structure while YAMAMOTO et al. discloses the claimed phosphorus percentage for the nickel phosphide portions.

Claim Rejections - 35 USC § 103

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2 and 4-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richter et al. [US 4,419,132] in view of YAMAMOTO et al. [JP 57109310A].

Claim 1, Richter et al. discloses an apparatus comprising:

a plunger [11];

a stator [1, 3, 7, 17] that forms a magnetic circuit in combination with the plunger, the stator further defining:

an accommodation portion for supporting the plunger with the accommodating portion so that the plunger is capable of reciprocation [1, figure 1]; and

an attraction portion [3, 17], wherein a magnetic attractive force attractive force attracts the plunger in a reciprocating direction of the plunger and acts between the attracting portion and the plunger; and

a coil [9] that generates the magnetic attractive force when energized, wherein either one or both of at least an outer peripheral wall of the plunger and at least an inner peripheral wall of the accommodating portion form(s) a magnetic portion made of nickel phosphide [21, 25 col. 3 lines 40-55].

Richter et al. fails to teach that the phosphorus content of the nickel phosphide is set within a range of 5% to 15% in mass percentage.

YAMAMOTO et al. discloses nickel plating surfaces with a phosphorus content of 5-10% in order to magnetic efficiency by increasing surface hardness [abs].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a phosphorus content of 5-10% as taught by YAMAMOTO et al. in the nickel plating of Richter et al. in order to increase the surface hardness.

Claim 2, Richter et al. discloses that the magnetic portion is heat treated [col. 1 line 60 to col. 2 line 5].

Claim 4, Richter et al. discloses that the magnetic portion comprises a nickel phosphide layer disposed on an outer periphery of a body of the plunger [figure 2].

Claim 5, Richter et al. discloses that the body of the plunger is made of iron [col. 3 line 42].

Claim 6, Richter et al. in view of YAMAMOTO et al. discloses the claimed invention except that the nickel phosphide layer has a surface hardness of about HV 900. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the surface hardness, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 7, Richter et al. discloses that the nickel phosphide layer is formed by plating and is heat treated [col. 3 lines 30-35].

Claim 8, Richter et al. discloses that the magnetic portion is limited to the outer peripheral wall of the plunger [figure 2].

Claim 9, Richter et al. discloses that a magnetic resistance portion [5] is arranged between the accommodating portion and the attracting portion [figure 2] and is thinner

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than said accommodating portion and attracting portion to suppress flux leakage between the accommodating portion and the attracting portion [figure 2].

Claim 10, Richter et al. discloses that a soft nitride layer is provided on the inner peripheral wall of the accommodating portion [figure 2].

Claim 11, Richter et al. in view of YAMAMOTO et al. discloses the claimed invention except that the nickel phosphide layer has a surface hardness of about HV 600. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the surface hardness, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kato et al. [US 6206343] in view of YAMAMOTO et al. [JP 57109310A].

Kato et al. discloses an apparatus comprising:

a housing defining [5, 10] a plurality of fluid paths [23, 24, 25] through a peripheral wall thereof;

a plunger [4];

a stator [12] located adjacent to the cylindrical housing, the forming a magnetic circuit in combination with the plunger, the stator further defining:

an accommodation portion for supporting the plunger with the accommodating portion so that the plunger is capable of reciprocation [figure 2]; and

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an attraction portion [3], wherein a magnetic attractive force attractive force attracts the plunger in a reciprocating direction of the plunger and acts between the attracting portion and the plunger; and
a coil [22] that generates the magnetic attractive force when energized,
a moving member [15] for reciprocating together with the plunger to control a flow rate of fluid flowing through the fluid paths; and
a biasing means [19] for biasing the moving member in a direction opposite to a direction in which the plunger is attracted by the attracting portion.

Kato et al. fails to teach that either one or both of at least an outer peripheral wall of the plunger and at least an inner peripheral wall of the accommodating portion form(s) a magnetic portion made of nickel phosphide with a phosphorus content of the magnetic portion is set within a range of 5% to 15% in mass percentage.

YAMAMOTO et al. discloses nickel plating frictional surfaces with a phosphorus content of 5-10% in order to magnetic efficiency by increasing surface hardness [abs].


It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a nickel plated the frictional sliding surfaces [i.e. the armature and/or its corresponding friction/sliding yoke surface] with phosphorus content of 5-10% as taught by YAMAMOTO et al. in the nickel plating of Richter et al. in order to increase the surface hardness.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard Rojas whose telephone number is (571) 272-1998. The examiner can normally be reached on M-F 8-4:00), every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin G. Enad can be reached on (571) 272-1990. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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